

CNC PLOTTER

SPARTUS Pro CUT HD Technical documentation

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1. BASIC INFORMATION

1.1. THE USE IN CONFORMITY WITH THE INTENDED PURPOSE

The CNC table adapted to work with the plasma cutter are numerically controlled devices designed for thermal cutting of metal sheets using a plasma or gas torch (depending on the selected model). Cutters allow cutting shapes according to previously prepared programs entered into the computer in the form of a file.

1.2. FIRST START-UP AND OPERATION

Installation, commissioning and training can only be carried out by an authorized SPARTUS service center. The buyer is obliged to prepare the place for installation of the device in accordance with the manufacturer's instructions described in the manual. The investor is obliged to prepare access to electricity, compressed air (in the case of using a gas burner - gases) and running water. The media parameters are specified by the manufacturer. The device may only be used after the operator has been trained in the field of use by an authorized representative of the manufacturer. Installation and training are completed by signing the technical acceptance protocol. The device may only be used by personnel trained by the manufacturer. Any interference or modification of the machine will end up in voiding the warranty. During the first start-up, pay attention to the phase sequence in the electrical system. Incorrect wiring may cause the device to react unintentionally. To avoid risks from moving parts, the installer must move away from them during commissioning and checking.

1.3. USER'S OBLIGATIONS

For proper and safe operation, the device must be located in a room where the temperature is not less than + 5°C and does not exceed + 40°C with max. humidity of 60%. The room in which the device is located must be equipped with ventilation.

1.4. THE USE NOT IN CONFORMITY WITH THE INTENDED PURPOSE

Any other use of the machine (in particular the use of undersized raw material) is not intended. In this case, the manufacturer is not responsible for any damage caused while using the machine.

1.5. GUARANTEE AND LIABILITY

The manufacturer guarantees buyer that the delivered machine corresponds to the catalog data and can correctly fulfill all tasks intended for its type. If in the production process, during the warranty period, an error occurs in the machine due to the fault of the manufacturer, they will carry out a repair of the damage free of charge. The manufacturer is not liable for damages resulting from:

- improper use of the machine
- improper connection, assembly, setting up, operation and maintenance of the machine
- using the machine with damaged, incorrectly adjusted or removed safety and protective devices
- disregarding the instructions of means of transport, storage, assembly, commissioning, working safety, maintenance, reconfiguration of the machine
- changes in the construction of the machine not agreed with the manufacturer
- incorrect repairs
- natural disasters as a result of majeure force
- the warranty does not cover the loss of profits associated with low production or lack of production due to any machine failure or delays in the delivery of spare parts and damage to third parties for these reasons
- any possible direct or indirect damage resulting from the use of the machine

In addition, the components considered to be wearing off quickly (described further in the instruction) which have worn out as a result of the operation of the machine, are not subject to replacement.

The manufacturer provides a 12 month warranty of the machine.

1.6. MACHINE CONSTRUCTION

The machine consists of the following assemblies:

- numerically controlled table
- cabinet or control panel

1.7. OPERATION PRINCIPLES

A sheet of metal (e.g. 1500x3000 mm) is placed on the plasma cutter table, the cutting program is loaded into the computer controller. After starting, the pieces of sheet metal are automatically cut out according to cutting program. The height of the plasma torch is automatically adjusted during the operation, ensuring an equal distance between the torch nozzle and the material being cut out.

The machine is controlled based on an industrial CNC controller, microprocessor controllers that are controlling drives of X and Y axes as well as module maintaining the same height of the torch from the material. Servo motors are used as drives.

1.8. ISSUE DATE

This documentation was developed in 2018.

2. TECHNICAL DATA

2.1. MACHINE IDENTIFICATION

Name: CNC table

The type / model and serial number of the device are given on the nameplate located on the CNC table and in the declaration of conformity attached to the documentation.

2.2. COMPLIANCE WITH STANDARDS

SPARTUS CNC tables meet the essential requirements of the Machinery Directive 2006/42/EC.

The EC declaration of conformity is attached to the documentation supplied with the device.

2.3. TECHNICAL SPECIFICATIONS

Machine Type	SPARTUS Pro CUT HD 2050	SPARTUS Pro CUT HD 2550	SPARTUS Pro CUT HD 2550
Transmission method	3M belts / tooth bar	3M belts / tooth bar	3M belts / tooth bar
Working field	1050x2050mm	1050x2050mm	1050x2050mm
Max speed	2500mm/min.	2500mm/min.	2500mm/min.
Scope of work - Z axis	90mm	90mm	90mm
Max cutting thickness for CUT 65 CNC plasma source	12mm	12mm	12mm
Max cutting thickness for CUT 105 CNC plasma source	20mm	20mm	20mm
Control Type	4 axis CNC controller	4 axis CNC controller	4 axis CNC controller
File format	PLT	PLT	PLT
Clearance in the Z axis	80mm / optional 130mm / 180mm	80mm / optional 130mm / 180mm	80mm / optional 130mm / 180mm

2.4. DELIVERY RANGE

The scope of delivery is presented in the handover report, which is attached to the table documentation.

2.5. CONNECTIONS

The plasma burner for proper operation requires:

- 400V / 50Hz

Current protection:

- B25 fuse

Compressed air supply:

- 8 bar pressure (flow depends on plasma source)

2.6. EQUIPMENT OPTIONS

1. CNC table with control
2. Plasma source Spartus CUT 65 CNC or Spartus CUT 105 CNC
3. Corel DRAW X5 graphics program
4. Section table
5. Water table
6. Voltage THC torch height regulator

Table equipment and option of additional equipment depend on individual orders placed by the customer. The equipment options listed above are informative.

3. BASIC SAFETY INSTRUCTIONS

3.1. INSTRUCTIONS

The basis of safe machine usage is knowledge of basic safety regulations and safety instructions. All persons operating the machine are obliged to follow the instructions, and in particular, the safety rules contained in this manual. In addition, the accident protection regulations apply at the place where the machine is being used. The following information does not release the operator from the obligation to comply with the occupational health and safety rules at work.

3.2. IMPORTANT SAFETY INDICATIONS

Safety indications are described in instructions which, if not followed, may endanger life or health. These guidelines should be followed with extreme caution. These instructions should be given to all machine operators.

3.3. GENERAL INFORMATION

In order to avoid possible accidents and to ensure trouble-free operation of the device, observe the applicable health and safety regulations, fire regulations and the provisions of this manual.

- The operating temperature in the room should be at least 5°C. A good visibility should be guaranteed. The floor must be rough and even. Electrical and pneumatic supply lines must not be a tripping hazard
- Only trained (by the manufacturer) operators may be designated to operate the plasma burner
- Any defects of the device should be reported immediately to those responsible for maintenance, while the device should be absolutely shut down until the defect is repaired
- Damaged or defective equipment must be repaired or taken out of service immediately
- Any modifications or interventions in the construction of the machine will void the warranty
- The use of non-genuine consumable parts may present a risk of electric shock or explosion, and may also damage machine parts
- The use of non-genuine consumable parts is prohibited and will void the warranty

3.4. GENERAL OPERATOR RESPONSIBILITIES

The machine operator is only permitted to run the machine with professionally trained* personnel:

- having appropriate knowledge in the field of CNC machinery
- knowing the general safety regulations and instruction of the machine manual
- knowing and understanding "Basic Safety Instructions" and the instructions on safe operation system concluded in this manual

*Qualified person (def.) - a person who has acquired appropriate technical education, received training and / or experience to enable predicting risks and avoiding these risks while using the machine (IEC 60204-1)

3.5. HAZARDS DURING THE OPERATION OF THE MACHINE

The following hazards may occur when using plasma burners:

- general threats
- hazards when cutting with a plasma torch
- danger during pneumatic tapping

3.6. POTENTIAL GENERAL HAZARDS DURING THE USE OF THE MACHINE

CNC table is made to eliminate situations that are hazardous to health or life. Nevertheless, there might be some hazards that will occur for the machine operator or bystanders

- Keep away from a gas / plasma torch when it is operating. During cutting, the flame temperature of the torch exceeds several thousand °C
- Be extra careful when material is pierced with the plasma torch because sparks of molten metal are blown out in every direction.
- The working burner moves during operation along three axes X, Y, Z. The speed is up to 25m/min. Standing in the working area of the device can cause the risk of crushing hand, leg or other body part.

The manufacturer prohibits:

- performing any maintenance operations with the device powered on
- removing any covers protecting the machine
- interfering with the connection or changing location of device sensors
- removing stickers informing about hazards from the burner's structural elements
- leaving any objects within machine's work that could cause a collision during work
- entering the burner's work area during operation of the device (operator can approach the machine table only after stopping the work by pressing the STOP button and pressing the safety button located on the control panel)

Malfunctions in the operation of the machine, in particular, the removal of covers and protective devices can lead to health-threatening situations. All deficiencies in this area should be immediately replaced.

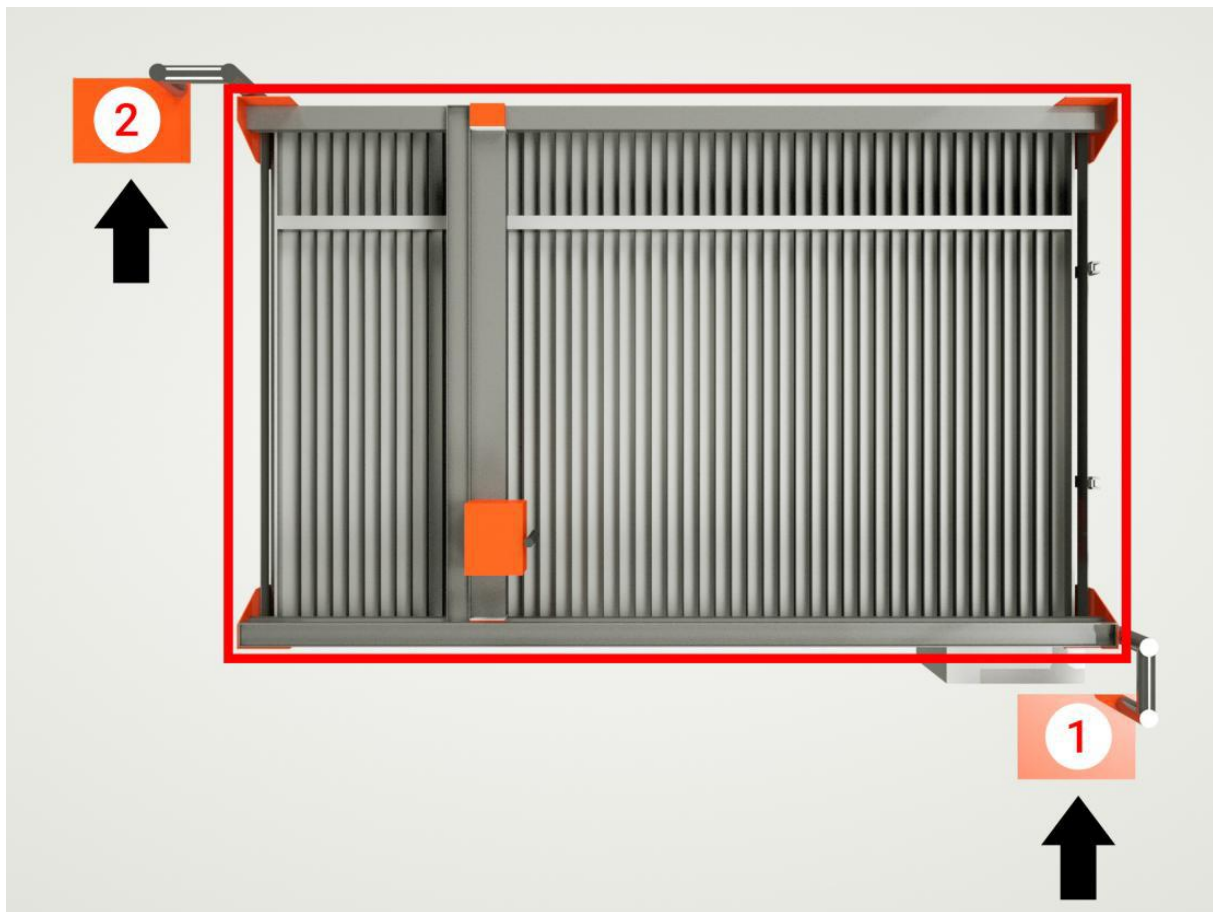
3.7. WORKPLACE

The picture below indicates the place where the operator should be during the work.

There should be enough space around the machine for convenient and safe cleaning and adjustment works.

The operator must not enter the machine working area after the work process has started.

During work or loading process only authorized persons are allowed in the working area.



Working area. The correct position of operators outside the working zone

1. Main working area
2. An additional workplace for cutting profiles

3.8. POTENTIAL HAZARDS DURING PROCESS OF CUTTING WITH PLASMA BURNER OR GAS BURNER

CNC table is made to eliminate situations that are hazardous to health or life. Nevertheless, there might be some hazards that will occur for the machine operator or bystanders.

When cutting with plasma and gas burners the following hazards might take place:

- during cutting, the temperature of the torch flame exceeds several thousand °C
- when cutting, there is a high radiation due to the burning of gases and the formation of an electric arc
- molten metal splinters may occur during piercing and cutting
- gases and fumes are present during the cutting process
- there is a risk of explosion when cutting with gas torches

3.8.1. HAZARDS THAT MIGHT BE CAUSED BY HIGH TEMPERATURE

The sources of high temperature that occur during the cutting process may come from:

- burner flame
- high burner temperature
- hot sheet metal element
- sparks and metal spatters
- liquid drop of the cutting element
- cracked gas hoses

The effect of high temperature can be:

- skin burn - complete destruction of the scarfskin
- deep burn - destruction of a part of the skin along with sebaceous glands
- total burn - complete destruction of the skin

Means of protection against the hazards mentioned above are:

- wearing of protective clothing marked as flame-retardant. These are gloves, a leather apron, protective footwear, a hat as well as face and eye protection.
- using of manual or mechanical methods of loading/unloading a hot material to protect the operator against high temperature;
- protecting the operator's eyes by using special protective glasses with a darkness level of min. 6 DIN.

3.8.2 HAZARDS THAT MIGHT BE CAUSED BY SPARKS AND SPLITS

During cutting and piercing, sparks or splinters are produced which can cause burns or a fire.

As a means of protection against spatters you should:

- use protective clothing marked as flame-retardant. These are gloves, a leather apron, protective footwear, a hat, face and eye protection
- not storing flammable substances near the device's working area
- separate the work place with special protective curtains from other work stations
- comply with fire regulations
- ensure that the fire extinguisher is in place

3.8.3. HAZARDS THAT MIGHT BE CAUSED BY GASES AND SMOKES

When machine operator is exposed to the fumes generated during cutting process for a long time, it might cause various diseases of the respiratory system. Dust comes into the human's body mainly through the respiratory tract. This way, to get into the body system, is used by very small particles that pose the greatest threat to humans. A common feature of all industrial dusts is irritating effect on upper respiratory tract of mucous membranes, e.g. iron oxides.

The effects of the above may be:

- eye and skin irritation
- nausea
- metallic fever
- headaches and dizziness
- respiratory disorders

As a means of protection against gases and smoke you should:

- ventilate the room in which the machine works
- extract fumes and gases that were produced during the process
- set the water level so that water comes into contact with the cutting material (applies to water tables and plasma cutting)
- control and do not exceed the max pollution values in the room where machine works
- comply with all regulations regarding the operation of gas cylinders and gas cutting torches

3.8.4. RISK OF INFRARED, UV PROTECTION AND VISIBLE RADIATION

During plasma or gas cutting, there is a high radiation due to the burning of gases and the formation of an electric arc.

The effects of radiation can be:

- redness, damage to the scarfskin
- faster ageing process
- change of skin colour

- allergies
- burns
- cancerous changes
- damage, burns to the cornea, lens, retina, eye swelling, cataracts
- loss of vision (when there is too much exposure to radiation)
- stroke or heat exhaustion

As a means of protection against radiation:

- protect the operator's eyes by using special protective glasses with a darkness level of at least 6 DIN
- protect the operator's face by using a welding protective mask
- use protective clothing that protects the operator against exposure to radiation
- avoid looking directly at the burner flame

3.8.5. EXPLOSION HAZARD DURING CUTTING WITH A GAS BURNER

There is a risk of explosion when using a CNC machine with a gas burner and technical gases.

The explosion can be caused by:

- oiled oxygen cylinders or welding equipment
- overheated technical gas cylinder
- oiled gas regulator during changing of cylinders
- smoking in places where it is prohibited
- using open fire in places where it is prohibited.

Hazards to the operator and bystanders due to the explosion:

- heat burns
- respiratory tract burns, respiratory problems
- eye irritation
- fainting
- asphyxiation
- injuries, injuries to limbs and head
- limb amputation
- death

Protection measures against explosion include:

- strictly comply with applicable regulations regarding the use and storage of gas cylinders and the installation of technical gases
- cylinders must be placed vertically and secured from falling
- in the event of damage to the installation, cylinders, regulators, hoses or other parts of the installation it is absolutely necessary to terminate the work and inform the maintenance department or the manager
- use hoses, gas regulators and nozzles only for their intended purpose
- do not use oil, grease in gas installations. All system components must be free of oil and grease
- use explosion protection (e.g. fuses used on the burner and regulators)
- carry out all work on the gas installation in accordance with applicable standards and by persons having appropriate qualifications
- shut off the gas supply after finishing work

If the machine is equipped in a plasma cutting device, detailed information on the rules of operation and hazards during plasma cutting can be found in the operating instructions provided by the manufacturer of the plasma source.

3.8.6. NOISE RISK

The equivalent sound pressure level at the workplace, corrected by the A characteristic, exceeds 70 dB (A) and is 83 dB (A). The final noise level during operation depends on many factors, including the dimensions and grade of the material.

The equivalent sound pressure level at the workplace, corrected by the characteristics of A, does not exceed 85 dB (A).

Hazards to the operator and bystanders due to noise:

Noise Level	Body reaction
to 70dB	Negative changes in the body
Over 70dB	Diseases - hypertension - stomach disorder - increase of adrenaline in the body
to 90dB	Hearing impairment and hearing loss over time
Over 120dB	Possible mechanical damage to the hearing
130dB	Pain limit

To protect your hearing, use:

- protective earphones
- anti-noise plugs

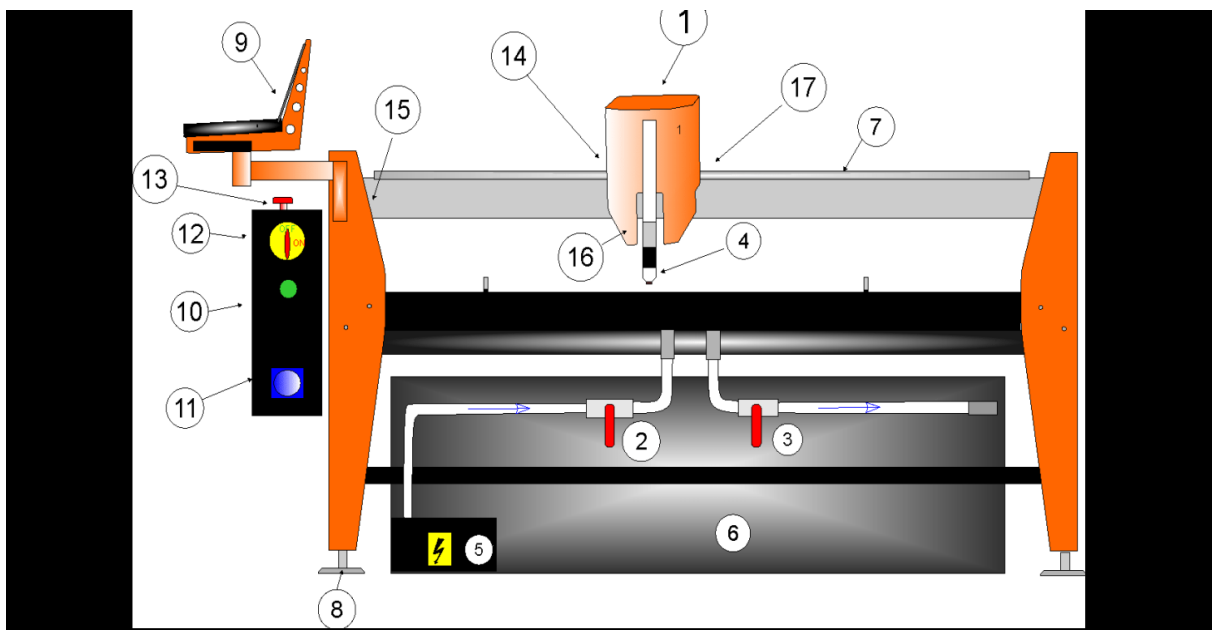
3.9. SAFETY DEVICES AND ELECTRIC SHOCK PROTECTION

- In the event of danger, the machine can be turned off using the EMERGENCY STOP button. This button is located on the control panel

- Electrical controls are placed in an electrical cabinet

The plasma burner is protected by sensors limiting the work area in the X-, X+, Y-, Y+ axes, respectively. Modifications, alterations or damages to elements limiting the work area may result in damage to the device. That is also a hazard of life or health loss for people standing nearby.

CNC table scheme



1. Working machine head
2. Top-up valve (opens and closes the reservoir tank after switching on or off respectively)
3. Coolant drain valve (for retention tank)
4. Plasma torch
5. Pump
6. Retention tank
7. Plotter bar Y axis
8. Adjustable bases for leveling the machine
9. Control panel with a computer
10. Start/Power switch
11. 230V AC socket supplying the computer
12. Main switch
13. Emergency stop switch
14. Y- limit switch
15. X+ limit switch (X- switch at the other end of the running rail)
16. Z+/Z- limit switch
17. Y + limit switch

3.10. ELECTRICAL SAFETY DURING STANDARD OPERATION

When operating the machine, follow the rules and guidelines below:

- before starting work, the operator should check the technical condition of the machine by visual inspection, in particular, the condition of guards, fastening elements and general condition of the electrical installation
- if the operator finds out that the machine is out of order, he should immediately secure it from starting it up and notify maintenance department or manager
- there must not be unnecessary items or tools on the numerically controlled table and control cabinet
- only use original consumable parts for work

- spare parts must only be installed and removed with the safety switch off
- load and work only with material dimensions specified in the TECHNICAL DATA chapter
- all adjustment activities should be carried out after disconnection of the main switch. Such activities must be supervised by a second person who could help if necessary
- it is not allowed to manually or mechanically remove waste materials while plasma burner is performing a cutting process. Clean the machine after switching off the power supply
- while the machine is working, only the operator controlling the burner may be at the operating position
- inspections and repairs are the responsibility of the maintenance team. The operator cannot perform such activities

Responsibilities of the machine operator are:

- compliance with safe working methods given in the manual and provided by the manager or foreman as a part of the instruction
- ensuring good technical condition of the burner and its full efficiency
- cleaning the table and linear guides after finishing work
- ensuring the disconnection from the power supply after work
- protection against starting up by unauthorized persons

3.11. DANGER OF ELECTRIC SHOCK

The burner should be connected to a power supply equipped with a switch that protects against electric shock. The table structure should be connected to the grounding installation of the building by PE wire (minimum 16 mm²). Work on the electrical installation may only be carried out by an authorized and qualified electrician with qualifications for the use of electrical equipment and installations of up to 1 kV. It is not allowed to change the settings of electrical devices. If electrical work requires voltage to be turned on, a second person must help to turn on and off the power if necessary. During repairs, adjustments or maintenance operations, the machine must be absolutely stopped and secured in such a way that it cannot be accidentally started. At least once a year the burner should be brought under electrical tests for electric shock protection. Once all tests are completed, the relevant approval report has to be issued. The plasma burner must be definitely connected to the grounding installation of the object in which it was installed via a protective conductor. In the case of a "water" table, the burner must absolutely work above the surface of the liquid. In case of burner having contact with water, this can result in electric shock and injuries to the operator.

3.12. PROTECTION OF ELECTRICAL INSTALLATION AGAINST HIGH VOLTAGE

It is the user's responsibility to protect the electrical installation system, to which the machine is connected, from accidental over-voltages that may damage the machine's control parts. Damages to the machine's control units caused by temporary surges and over-voltages will not be repaired under the warranty. In such a case, the warranty will be voided by the manufacturer. The plasma burner as a computer-controlled numerical device should be protected by an uninterruptible power supply (UPS) with a minimum power of 1000W.

3.13. ELECTROMAGNETIC FIELDS (EMF)

Electric current flowing through any conductor creates locally electric and magnetic fields (EMF - electromagnetic field). To reduce the danger associated with the EMF fields:

- never wrap the body with torch wires
- do not stand between burner wires

- keep both hoses on one side of your body.
- the return hose should be connected as close as possible to the place where the cutting process is carried out
- do not work, sit or lean on the plasma generator while it is operating

DANGER: The electromagnetic field (EMF) generated during plasma cutting can interfere with the functioning of medical implants, e.g. a cardiac stimulator or hearing aid. People with medical implants, e.g. a pacemaker, are required to consult a doctor before starting work, and take special care. It is forbidden to stay near the place where the plasma cutting process is carried out without consultation with an expert.

4. TRANSPORT AND STORAGE

During transport, the machine can be partially dismantled into:

- CNC table
- control cabinet
- cutter bar

During the road transport, the machine must be secured (e.g. with wedges, belts) so that it does not move. When handling the machine, anybody must not be under a lifted load. The forks of the forklift must be set to the max position when unloading. The crossbar should be set in a position close to the middle and secured against possible displacement. Pay special attention to avoid damaging the tank and hydraulic hoses inside the device when using the forklift.

4.1. EXTERNAL DIMENSIONS AND WEIGHT

SPARTUS Pro CUT HD 2050

- length x width x height: 2550 x 2000 x 130 mm
- weight: ~ 700 - 800 kg

SPARTUS Pro CUT HD 2550

- length x width x height: 3050 x 2200 x 130 mm
- weight: ~ 900 - 1,000 kg

SPARTUS Pro CUT HD 3050

- length x width x height: 3550 x 2400 x 130 mm
- weight: ~ 1,200 - 1,350 kg

4.2. PACKAGE

The device is not wrapped up. It is not protected against rain. Means of transport and storage must protect machine against weather conditions.

4.3. INSPECTION ON RECEPTION

In the event of deficiencies in delivery, the recipient must fill up a relevant document stating these deficiencies and provide to the seller.

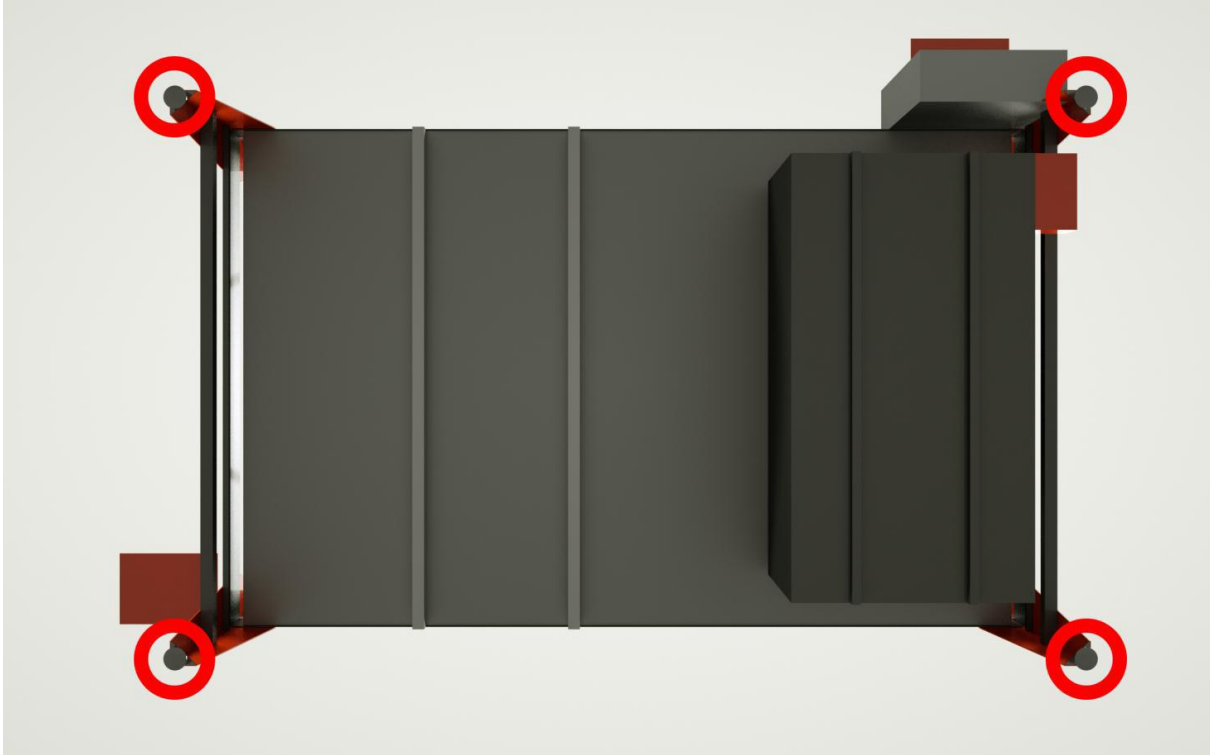
4.4. STORAGE

The machine is preserved and can be stored in a dry room for 3 months. It can stand without restrictions in a heated room.

5. SETTING UP, INSTALLATION, STARTING

5.1. INSTALLATION AND SETTING UP THE MACHINE

The machine should be placed on a horizontal foundation or floor. It must be levelled. There are leveling screws at the ends of the legs for height adjustment. When inserting and screwing, the raised loads must be firmly supported. Connecting cables must not be a tripping hazard. Electrical cables (including control cables disconnected for transport) are connected in a junction box in accordance with relevant numbering.



Location of regulatory and leveling feet

5.2. CLEANING

The metallic table surfaces are coated with an anti-corrosion agent. Before startup, wipe them dry.

5.3. CONNECTION OF ELECTRICITY

This work can only be carried out by an authorized electrician in the field of operating electrical equipment and installations up to 1 kV. Connection parameters are described in the TECHNICAL DATA chapter. Before connecting machine to the network, it is recommended to check the insulation resistance, which should not exceed 1 MV. When the machine has stood for more than 15 days in an unheated room, a check is necessary. A machine with damp insulation should be dried and the insulation resistance checked again.

5.4. CONNECTION OF VENTILATION (applies to sectional table)

The ventilation duct is located at the back-right part of the CNC table. The filtering device must provide a capacity of approx. 3000 m³/h. It is forbidden to use a filter fan when machining aluminum alloys, the resulting magnesium dust may be accumulated in the filter cartridges and that may cause an explosion hazard.

5.5. WATER TABLE

The use of a water table makes it possible to significantly reduce the deformation of cut materials, especially with small thicknesses such as 0.5 - 3 mm. It also reduces noise generated during the cutting process as well as smoke and radiation. Remember that the used coolant has to be utilised/recycled. The manufacturer recommends using a corrosion inhibitor solution liquid to protect the metal parts of the machine against corrosion.

6. WORKING PROCESS

6.1. START-UP, WORKING CYCLE

When the machine is adjusted, the order of startup is as follows:

1. Turn on the main switch.
2. Turn on the power of the plasma cutter with the switch on the control panel.
3. Turn on the power to the plasma generator.
4. Start the CNC control program.

Work in a cycle always starts with putting a metal sheet on the table.

6.2. MACHINE RECONFIGURATION

Replacing the torch to cut a material with different thickness:

1. Turn the machine off with the main switch.
2. Turn off the power to the plasma generator.
3. Remove the plasma / gas torch.
4. Install the plasma / gas torch.

6.3. SHUTDOWN DURING TYPICAL OPERATION AND EMERGENCY

6.3.1. STANDARD SHUTDOWN

At the end of the cycle or during operation, it is possible to stop the machine with the "STOP" button on the control panel or the "STOP" virtual key in the computer program.

6.3.2. EMERGENCY STOP

In an emergency, you can stop the machine at any time with the EMERGENCY STOP switch located on the control panel.

6.4. CONTINUATION OF WORK AFTER EMERGENCY STOP OR FAULT

If, in an emergency, the machine was stopped by an emergency switch, first you need to remove the cause of the hazard. To unlock the EMERGENCY STOP button turn it to the right.

Resetting the cutting program stops the machine. After restarting the program and confirming it on the operator panel, the machine continues the cycle.

6.5. INTERFERENCE AT WORK, FAULTS

The cycle may stop, e.g. when the torch support is too close to the extreme positions of the CNC table. It also stops due to torch contact with the metal sheet detected by the collision system (arc breaking during the cutting process or for other reasons not described). Interference affecting the operation of the CNC table may arise when the device is connected to a plasma source in which ignition occurred by using high frequency (HF). This frequency strongly affects the electronic components of the CNC table and in extreme cases may cause their damage. To eliminate the effects

of high frequency:

- ground the machine structure with a PE wire min. 16mm² with the electrical grounding point no further than 6m from the device
- ground the plasma source with a PE cable min. 16mm² with the electrical grounding point not further than 6m from the device
- ground the head support in which the plasma source burner is located
- apply the so-called EMC braid over the entire length of the plasma torch, connecting it to the grounding of the electrical system

The procedures and methods presented above may not be effective whenever RFI / EMI interference suppression is required. The final way to implement these solutions may depend on the plasma source being installed. However, they should be used consistently for all models of the selected group.

In the event of high levels of interference, it is recommended that the torch lead should be at a minimum distance of 150 mm from other electrical cables.

7. **MAINTENANCE**

Failure to follow the lubrication and maintenance regulations for the plasma CNC may cause equipment failure. If the users are found out that they do not comply with the guidelines included in the documentation, the manufacturer reserves the right to make a paid repair excluding the warranty conditions.

7.1 PERIODIC GREASING

- toothed bar
 - Z axis ball screw
- Every day before starting and after finishing work - wipe the linear guides of X and Y axis with a dry cloth, clean the table surface from waste materials remaining after the device's work. Lack of systematic wiping off linear guides will result in premature corrosion of drive components and damage to linear trolleys of the device. In practice, properly maintained elements mentioned above will help the machine to reach a lifetime service of 12-18 months during the production process whereas improper maintenance or lack of service will decrease that to 5-6 months.
- Maintenance once a week - the linear guides should be greased once a week with machine oil or other oil specified by the manufacturer. For this purpose, the guides should be wiped dry with a clean cloth, greased with an appropriate agent. Then make a few complete rides from the beginning to the end of each axis. Usually three or four passes are sufficient. After these operations, wipe off excess of oil from the guides. The lack of systematic maintenance of the X-axis and the Y-axis linear guides may result in premature corrosion. The bar and gears should be cleaned with a wire brush or compressed air at least once in every 7 days. After cleaning, a small amount of grease should be applied to the bar and gear. Excess of grease should be removed with a cloth.
- All maintenance operations must be carried out with the main switch turned off.

7.2 REMOVAL AND DISPOSAL

During scraping, aluminum scrap (pneumatic components) must be separated from steel scrap. Pneumatic hoses made of polypropylene are utilized as plastics. The wiring and engine coils are considered as copper scrap.

7.3 SERVICE

The manufacturer provides a 12-month warranty. Minor post-warranty repairs may be carried out by the user only after consulting the manufacturer. If necessary, the manufacturer send spare parts which were ordered. Major post-warranty repairs should be performed by the manufacturer or an authorized service center.

8. LIST OF SPARE PARTS

8.1. LIST OF SPARE PARTS THAT WEAR OUT QUICKLY

- Torch components such as electrode nozzles, caps, shields

8.2. DAILY SERVICE LIST OF ACTIONS BEFORE STARTING WORK

- inspect the technical condition of the machine, check that all the components are ready for work
- visually inspect the condition of electrical wiring, gas and air lines
- in the event of any faults, they must be rectified before putting the machine into operation
- wipe the linear guides of the X and Y axis with a dry cloth

These activities must be carried out with the device powered off

8.3. DAILY MAINTENANCE LIST OF ACTIONS AFTER ENDING WORK

- clean spatters and dust off the burner with a dry cloth
- use the compressed air to blow out dust and spatters from the X- and Y-axis gears
- check and clean the burner consumables, replace them if necessary.

9. PERIODIC SERVICE

- Tank and table cleaning, depending on the intensity of use.
- Greasing of the ball screw of Z axis in every 20 hours of operation.

IT IS FORBIDDEN TO CARRIED OUT A WELDING PROCESS OR GRINDING WORKS "ON THE MACHINE" OR NEARBY. THIS COULD DAMAGE THE CONTROLLER, FOR WHICH THE MANUFACTURER IS NOT RESPONSIBLE. THE WARRANTY COULD BE VOID AS WELL.